Perception Dynamics of Farmers Affecting Sustainability of Mustard Production: An Analytical Study

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ABSTRACT

Oilseed sector as a whole and rapeseed–mustard in particular, has witnessed a significant increase in production in the last decade. However research results show that there is vast scope to increase the present productivity level of rapeseed-mustard in the country. Despite the technological advancement in mustard for last two decades to attain higher yields, the vast gap exists between the actual yields obtained at farmer's field and the yield obtained at the research farms which shows the low adoption of recommended technologies by the farmers. The importance of agricultural technologies in the development process cannot be overemphasized. This study has sought to ascertain respondents' perceptions on reasons affecting sustainability of mustard production based on sample of 120 farmer respondents from Bharatpur and Agra district. The study reported that adoption of time of sowing recommendation was maximum with 82.5 MPS followed by irrigation practices (78.2 MPS).The adoption of improved varieties of mustard was also high (75.7 MPS). The level of adoption of seed rate & spacing (66.7 MPS) and harvesting & threshing (56.9 MPS) was medium. There was very low adoption in case of pest management, soil treatment, and disease management with MPS 16.9, 10.8 and 8.8, respectively. The study reported that overall and important constraints experienced by the respondents were, low selling price (93.2%) and high cost of cultivation (88.8%) as economic, non-availability of pure seeds at sowing time (88.1%) and inadequate supply of fertilizers (83.8%) as infrastructural, high temperature at the time of sowing (88.8%) and poor fertility of soil (73.2%) as agro-climatic, lack of technological know-how (87.5%) and lack of visit by extension personnel to the village (84.4%) as technological constraints. Therefore, a suitable strategy involving all concerned agencies should be devised to overcome these constraints to increase the level of adoption of recommended practices.

Key words: *Mustard; Perception; Sustainability; Adoption; Factors;*

Rapeseed-mustard oilseed crops are important sources of edible oil in Indian diet. India is the second largest rapeseed-mustard growing country in the world contributing about 25 and 15 per cent, respectively, to world's acreage and production. The crop commodity is the important group of oilseed crops in India accounting for about 23 per cent of the total oilseed production and 24.7 per cent of the gross cropped area under oilseeds in the country. Oilseed sector as a whole and rapeseed–mustard in particular, has witnessed a significant increase in production in the last decade. However there has been fluctuation in production and productivity of rapeseed-mustard over the period which affects the sustainability of production. Research results show that there is vast scope to increase the present productivity level of rapeseed-mustard in the country.

The improved technology developed for mustard crop at research stations and tested at farmer's field for its viability and feasibility has convincingly established the superiority of the technology over the traditional practices. Despite the technological advancement in mustard for last two decades to attain higher yields, the vast gap exists between the actual yields obtained at farmer's field and the yield obtained at the research farms which shows the low adoption of recommended technologies by the farmers. Even in areas where the adoption of modern varieties is relatively high, farmer's yield of mustard are often lower than the known potential yield of this crop. The factors preventing farmers from achieving the full potential of the new

technology may be economic, infrastructural, climatic, technological, etc. *Yadav et al (1999)* reported in his study that the extension gap was lower than the technology gap, but there was still a need to educate farmers in adoption of improved technology. *Zaman et al (2000)* also stated that there was a serious gap between potential and on-farm yield of mustard varieties mainly due to lack of awareness, which indicated the necessity of educating farmers about adoption of proper and improved technology of growing rapeseed and mustard, giving priority to location-specific transfer of technology adopting suitable extension strategies.

Keeping in view of this, this study has sought to ascertain respondents' perceptions on reasons for the reported low trend of adoption of mustard production technologies. In essence, the study sought to answer pertinent questions relating to: (i) the level of adoption of specified components of mustard production and (ii) respondents' perceptions of constraints affecting adoption of technologies disseminated through various programmes.

METHODOLGY

The study was carried out in Bharatpur district of Rajasthan and Agra district of Uttar Pradesh during 2010-11. For the purpose of the study, two villages namely Paharsar and Auw of Bharatpur district of Rajasthan and one village namely Nagla Vishnu of Agra district of Uttar Pradesh, were selected due to implementation of different extension programmes like FLDs and DRMR technology demonstrations by DRMR and Department of Agricultere Extension, RBS college, Agra. A sample of 120 farmers were selected randomly taking equal representation i.e. 40 respondents from each of the selected villages.

The study was based on the primary as well as secondary data. The field data on input and output along with other required information were collected through pre-structured schedules and questionnaires by personal interview method, focussed group discussion and with the help of participatory rural appraisal.

For studying adoption level, a standardized adoption scale developed by the investigators was used to collect the data for 12 major cultivation practices viz. i) variety, ii) field preparation, iii) soil treatment, iv) seed treatment, v) sowing time, vi) seed rate and spacing, vii) fertilizer management, viii) irrigation management, ix) weed management, x) pest management, xi) disease management and xii) harvesting and threshing. Each major practice was further divided into sub-practices and score assigned against each practice according to its importance. After assigning the scores to different adopted practices by the farmers, adoption index were computed for selected 12 practices as mean per cent scores (MPS).

$$\text{Adoption index (MPS)} = \frac{\text{Total adoption score}}{\text{Maximum score}} \times 100$$

On the basis of adoption index, the adoption of different practices were categorized into low (< 40 MPS), medium (40-60 MPS), high (61-80 MPS) and very high (> 80 MPS) level.

The constraints in adoption of improved practices of mustard cultivation among the farmers refer to the barriers or hindrances, which come in the way of adoption of the practices. To determine the perceived constraints, major aspects were identified for the present investigation. Constraints were classified as economic, infrastructure, agro-climatic and technological and a pre-structured schedule was used for identifying them. Respondents were categorized on the basis of per cent distribution in different constraints category with ranks assigned accordingly.

RESULTS AND DISCUSSION

Level of adoption of different components of recommended mustard technologies : The data depict in Table 1 and 2 reveal adoption level of different recommended mustard technologies in study area. The data show almost similar pattern of level of adoption in both area. When we see the pooled data of both area, it

Table 1: Adoption levels of different components of recommended mustard technologies

Adoption of practices	Raj. (80) MPS	UP (40) MPS	Total (120) MPS
Improved variety	78.8	72.5	75.7
Field preparation	55.0	42.5	48.8
Soil treatment	11.3	10.0	10.8
Seed treatment	37.5	15.0	26.3
Time of sowing	85.0	82.5	84.2
Seed rate & spacing	68.8	62.5	66.7
Fertilizer management	56.3	45.0	50.7
Irrigation	76.3	80.0	78.2
Weed management	41.3	62.5	51.9
Pest management	18.8	15.0	16.9
Disease management	10.0	7.5	8.8
Harvesting & threshing	58.8	55.0	56.9

Table 2 . Categorization of adopted mustard production technology

Adoption level (% Score)	Raj. (80)	UP (40)
Low (< 40)	Soil treatment, seed treatment, pest and disease management	Soil treatment, seed treatment, pest and disease management
Medium (40-60)	Field preparation, fertilizer management, Weed management, harvesting & threshing	Field preparation, fertilizer management, harvesting & threshing
High (61-80)	Variety, seed rate & spacing, irrigation management,	Variety, seed rate & spacing, irrigation management, weed management
Very high (> 80)	Time of sowing,	Time of sowing

was found that majority of respondents were sowing the crop in time as adoption of "time of sowing" aspect was reported highest by both groups of respondents (Raj. and UP). The MPS of this aspect was 84.2. This was followed by the practices like "irrigation management", improved varieties, and "seed rate and spacing", where level of adoption was high (MPS 61-80). The mean per cent scores of these practices were 78.2, 75.7, and 66.7, respectively. The level of adoption of "harvesting and threshing", "weed management", "fertilizer management" and "field preparation", was medium (MPS 40-60) with MPS 56.9, 51.9, 50.7 and 48.8, respectively. The majority of respondents had low adoption (MPS <40) of "seed treatment", "pest management", "soil treatment" and "disease management" with MPS 26.3, 16.9, 10.8 and 8.8, respectively.

Sharma, et. al (2011) also reported high adoption of time of sowing and low adoption of field preparation, seed treatment, pest and disease management. Similarly *Meena and Shekhawat (2012)* reported high adoption (98%) of recommended variety and time of sowing of mustard (95%). *Sharma and Sharma (2006)* also reported negligible adoption of plant protection measures.

Perception dynamics of farmers affecting sustainability of mustard production: Perception of the respondents affecting sustainability of mustard production was classified as economic, infrastructure, agro-climatic and technological and a pre-structured schedule was used for identifying them.

Perception of Economic factors: Among the economic constraints (Table 3A) low selling price of mustard was ranked first by both groups of respondents (93.2%). High cost of crop cultivation (88.8%), fertilizers (86.3%), pesticides/weedicides (84.4) and lack of profitable marketing system (77.5%) were other major constraints reported by the respondents which act as hindrance in adoption of recommended technology. Keeping in view the huge oil import and its ever increasing demand in the country, the policy makers should ensure better remuneration to mustard growers, so that they do not shift to another profitable crop. There is an urgent need to supply fertilizers, insecticides, weedicides at a low price so that the economically poorer farmers may benefit as the second most serious constraint reported by them was high cost of cultivation. In order that the farmers enjoy the fruits of their hard labour, Government policy makers should formulate specific marketing policies to avoid the exploitation of the farmers.

Perception of Infrastructural factors: It can be inferred from Table 3 (B) that non-availability of pure/ improved seed at the time of sowing was ranked first by both groups of respondents (88.1%). Timely supply of improved seed through co-operatives at village level is essential, quality control of improved seed is another important aspect to safeguard from dealers of spurious seeds which causes an economic loss to farmers. Fertilizer is the important input for higher crop production and availability of labourers is the basic requirement for performing all the agricultural operations but non-availability of chemical fertilizers (83.8%) and labourers at the vital time (80.7%) were expressed another important infrastructural constraints which led to low adoption of recommended technology. Therefore, timely and required supply of fertilizers should be ensured to the farmers and policy should be made so that labourers are available at the time of crucial agricultural operations. The farmers reported a serious constraint of inadequate supply of electricity at time of sowing and irrigation (80.0%). These two stages are very crucial for crop growth, therefore, the Government authorities should ensure continuous supply of electricity at these stages. Non-availability of credit by financial institutions were reported by 78.2 per cent respondents followed by lack of irrigation facilities (73.2%) and inability to purchase improved implements (70.0%) at the time of requirement or application. The improved agricultural implements are beyond the reach of majority of the farmers due to their high cost, these implements have to be low cost and

Table 3: Respondents' perception affecting sustainability of mustard production

Perception Dynamics of different factors	Group of farmers				Total (N=120)	
	Raj. (n_1=80)		UP (n_2=40)			
	%	Rank	%	Rank	%	Rank
A. *Economic factors*						
Low selling price of mustard	93.8	I	92.5	I	93.2	I
High cost of crop cultivation	87.5	II	90.0	II	88.8	II
High cost of fertilizers	85.0	III	87.5	III	86.3	III
High cost of pesticides and weedicides	81.3	IV	87.5	III	84.4	IV
Lack of profitable marketing system	80.0	V	75.0	IV	77.5	V
B. *Infrastructural factors*						
Non-availability of pure seeds at sowing time	86.2	I	90.0	I	88.1	I
Inadequate supply of fertilizers	80.0	III	87.5	II	83.8	II
Shortage of labour at the time of ag. operations	81.3	II	80.0	IV	80.7	III
Inadequate supply of electricity	75.0	VI	85.0	III	80.0	IV
Non-availability of credit by financial institutions	78.8	IV	77.5	V	78.2	V
Lack of irrigation facilities	76.3	V	70.0	VI	73.2	VI
Inability to purchase improved implements	72.5	VII	67.5	VII	70.0	VII
C. *Agro-climatic factors*						
High temperature at the time of sowing	92.5	I	85.0	I	88.8	I
Poor fertility of soil	83.8	III	62.5	III	73.2	II
Occurrence of frost and hailstorms	70.0	IV	75.0	II	72.5	III
Poor water quality	87.5	II	45.0	IV	66.3	IV
Salinity/alkalinity in the soil	56.3	V	35.0	V	45.7	V
D. Technological factors						
Lack of technological know-how	85.0	I	90.0	I	87.5	I
Lack of visit by extension personnel to the village	81.3	II	87.5	II	84.4	II
Lack of farmers' training	76.3	III	85.0	III	80.7	III
More attack of insects-pest and diseases	75.0	IV	80.0	IV	77.5	IV
Unavailability of suitable equipment	71.3	V	75.0	V	73.2	V

may be provided on hire to the farmers through the co-operative society. Large number of farmers may benefit from timely credit facilities and simple procedures of the financial institutions. Further, efforts should be made to develop irrigation facilities which are also important input for increasing agriculture production.

Perception of Agro-climate factors: Table 3 (C) highlights the agro-climatic constraints as reported by the respondents. High temperature at the time of sowing (88.8%), poor soil fertility (73.2%) and occurrence of frost and hailstorms (72.5%) were ranked as I, II and III, respectively, by both groups of respondents whereas, poor water quality and salinity/alkalinity in the soil were ranked as IV and V, respectively, by the respondents. Keeping in view of these constraints, research efforts should be made to develop high temperature tolerant cultivar. Farmers should be motivated to use more green manure, farm yard manure, compost, etc. to improve soil fertility and use of amendments for treatment of salinity/ alkalinity and water treatment to improve its quality.

Perception of Technological factors : Knowledge of recommended technologies of mustard cultivation is pre-requisite for adoption of them, but lack of technological know-how was ranked first by both groups of respondents (87.5%) which indicates the most important constraint in way of adoption of mustard production technology (Table 3 D). The other two constraints reported by farmers, lack of visit by extension personnel (II) and lack of training (III), restate the fact that if the extension system had worked effectively and organized need and skill based training programme based on farmer's needs and problems, the question of lack of knowledge of technological know-how would not have aroused. The researchers should attempt for pest and disease resistant varieties as attack of insects-pest and diseases was ranked IV most serious constraint by

respondents (77.5%). Unavailability of suitable equipments was also reported important constraint by the respondents (73.2%), therefore, efforts should also be made to develop and popularize suitable equipment which can be used in mustard cultivation like seed-cum fertilizer drill, weeding and hoeing machine, sprayers, harvester, etc.

On the basis of the findings, it can be said that 5 economic, 7 infrastructural, 4 agro-climatic and 5 technological constraints were affecting the adoption of mustard technology among different groups of farmers in different magnitude. *Sharma and Sharma (2006)* reported lack of knowledge as major constraint in adoption of recommended technology. *Singh, P. et al (2000)* and *Suthar, et. al (2009)* also reported similar kind of constraints in adoption of recommended cultivation practices of mustard. Similarly *Lakhera, et. al (2011)* also reported high cost as well as untimely availability of fertilizers as constraints in adoption of recommended fertilizer management.

CONCLUSION

The level of production of any crop directly depends on level of adoption of recommended technology of that crop. Research experiments show the high potential of recommended technologies of mustard but non-adoption of them by the farmers due to one or other reasons is responsible for low productivity. The present study has identified the level of adoption of different components of mustard production and constraints in way of adoption of recommended technologies affecting sustainability. It was found that adoption of seed treatment, soil treatment, pest and disease management, weed management, fertilizer management and field preparation was low to medium. Extension system should make efforts to educate the farmers on these components which are very important to affect the productivity of mustard.

The important constraints experienced by the respondents were, low selling price, non-availability of seed, high temperature at the time of sowing, lack of technological know-how, high cost of crop cultivation, inadequate supply of fertilizers, poor fertility of soil, lack of visits of extension personnel, high cost of chemical fertilizer, shortage of labourers at the time of agriculture operation, lack of farmers' training, etc. The results of this study will be helpful for policy makers, researchers, extension personnel and all other concerned to devise suitable strategy for addressing the identified constraints and ensuring timely supply and easy availability of quality seed, chemical fertilizers, pesticides and improved agricultural implements to enable the farmers to adopt all the recommended technologies to obtain better yields of mustard.

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